Claims

1. An automotive window regulator system comprising:

a guide rod having a linear axis;

a runner connected to the rod for movement therealong between a first position and a second position; and

a window carrier engaged by the runner for movement thereby;

wherein the runner and carrier are rotatably connected to each other about a rotational axis orthogonal to the axis of the rod and translatable with respect to the central axis as the runner moves between the first and second positions, to permit nonparallel movement of the carrier with respect to the rod as the runner moves between the first and second positions.

2. A system according to claim 1, including an arcuate window mounted to said carrier, and further comprising first and second glass run channels, each having the same radius of curvature of the window, into which first and second edges of the window are received, the glass run channels defining the path of travel of the window as the runner moves between the first and second positions.

3. A system according to claim 1, including an arcuate window mounted to said carrier, and further comprising a guide which engages the carrier, the guide having a radius of curvature concentric with the radius of curvature of the window such that the carrier guides the window along a path coincident with the radius of curvature of the window as the runner moves between the first and second positions.

4. A system according to claim 1, wherein one or the other of the runner and carrier defines a channel and the other of the runner and carrier comprises a shaft received in the channel, the shaft being rotatable about said rotational axis, and translatable within the channel to obtain said non-parallel movement of the carrier.

5. A system according to claim 1, wherein the shaft is provided by a trunnion.

6. A system according to claim 1, wherein the runner and carrier are connected by an arm pivotally connected to each of the runner and carrier.

7. A system according to claim 1, wherein the guide rod is a straight threaded screw and the runner includes a threaded bore threadingly received onto the rod.

8. A system according to claim 7, further comprising a motor which rotationally drives the rod about its central axis to move the runner between the first and second positions.

9. An automotive window regulator, comprising:

an upright guide rod having a central linear axis;

a runner connected to the rod for movement therealong between a lower position and an upper position;

a window carrier engaged by the runner for movement thereby along the axis of the rod; and

an arcuate window, having a radius of curvature, affixed to the carrier; and wherein,

the runner and the carrier are rotatably connected to each other about a rotational axis orthogonal to the axis of the rod and the carrier is radially movable with respect to the central axis of the rod as the runner moves between the lower and upper positions to permit movement of the window along an arcuate path having a radius of curvature equal to that of the window.

10. A window regulator, comprising:

a linear element, defining a first axis;

a runner translatable along the linear element; and

a window carrier pivotally and slidably connected to the runner so as to translate along a second axis substantially orthogonal to the first axis and rotate about a third axis substantially orthogonal to both the first and second axes.

11. A window regulator according to claim 10, including:

an arcuate window mounted to the window carrier; and

at least one arcuate glass run channel having a curvature substantially identical to the curvature of the window, the window being slidably mounted in the at least one glass run channel.

12. A window regulator according to claim 11, including means for translating the runner along the linear element, whereby the runner follows a linear path and the window and window carrier follow an arcuate path dictated by the glass run channels.

13. A window regulator according to claim 12, wherein:

the linear element is a threaded drive rod;

the runner includes a threaded bore mounted on the drive rod; and

the runner translation means includes means for rotating the drive rod and preventing the rotation of the runner relative to the drive rod.

14. A window regulator according to claim 13, wherein the runner rotation prevention means includes a channel formed in one of the carrier and the runner extending substantially parallel to the first axis, the other of the pair having a longitudinal body mounted in the channel.

15. A window regulator according to claim 12, including a frame having an arcuate guide substantially matching the curvature of the window, and wherein the window carrier is slidably mounted to the arcuate guide.

16. A window regulator according to claim 12, wherein one of the runner and the carrier includes at least one channel extending substantially parallel to the second axis and the other of the pair includes at least one trunnion disposed in the channel.

17. A window regulator according to claim 12, wherein the linear element is a frame having a substantially linear channel therein defining the first axis, the runner being mounted in the channel.

18. A window regulator according to claim 17, wherein the runner has a slot therein defining the second axis, and a shank pivotally mounts the window carrier to the runner via the slot.